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SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE



JANUARY 16, 1937

Plow at Work

See Page 42

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DO YOU KNOW?

Tomatoes absorb odors more easily than any other fruit.

A huge synthetic rubber industry is part of Germany's new "four year plan."

In old Japan it was an offense punished by death to cut down wrongfully any one of seven famous tree species.

Glare caused by light reflected from a light-colored, glossy wall may fade some textiles, experiments indicate.

An Egyptian sarcophagus of rose granite weighing three tons is to be brought to the Brooklyn Museum from Egypt.

Compressed coal in neat 10 or 15 pound packages is now delivered by white-coated drivers in white enameled trucks.

All of the available water of western United States is not enough to provide adequate supplies for more than about three out of each 100 acres in the West.

Germany expects to be less dependent on foreign countries for leather tanning materials, now that a new chemical process has been evolved, using a synthetic agent.

Important events in Java are celebrated by theatrical performances.

The western mocking bird is reported thriving and spreading through California.

The earliest inscribed epitaphs known are those the ancient Egyptians placed on sarcophagi and coffins.

A method of X-raying oranges rapidly, in order to pick out imperfect fruit, is being tried in California.

The census of the Soviet Union, already begun, is expected to show almost 180 million people under Soviet rule.

About 300 A.D., Antioch in Syria had a system of public street lighting, consisting of lanterns suspended on ropes.

A Hungarian scientist is reported to have prepared a fertilizing dye which makes plants highly sensitive to sunlight, so that they grow faster and attain giant size.

Fear that thallium compounds used in killing rats and other rodents may injure plant growth is discounted by government scientists who have made both field and laboratory investigations.

WITH THE SCIENCES THIS WEEK

Most articles are based on communications to Science Service or papers before meetings, but where published sources are used they are referred to in the article.

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MEDICINE

Chemical Cure For Cancer Is Only a Matter of Time

"Some Chemical in a Bottle Somewhere Might Be Just The Thing" Pharmacologist Tells Science Meeting

FUNDAMENTAL knowledge of cancer which probably is paving the way for discovery of a chemical means of controlling the disease was reported to the American Association for the Advancement of Science by Drs. Carl Voegtlin, J. M. Johnson, M. E. Maver and J. W. Thompson of the U. S. Public Health Service's National Institute of Health.

This research team did not report a chemical cure for cancer or anything like that. But Dr. Voegtlin indicated, in an interview, that discovery of such a cure by some research group is probably only a matter of time and that the chemical itself is probably already on laboratory shelves.

"Some chemical in a bottle somewhere might be just the thing," he said.

On the other hand, it may be necessary for scientists to make a new chemical especially for this life-saving job, as salvarsan had to be created for the cure of syphilis.

Dr. Voegtlin himself made the comparison between the present world-wide search for a cancer cure and the situation with regard to syphilis before Ehrlich's development of salvarsan. The problem Ehrlich and other scientists of his generation faced was to find something that would kill the parasite of syphilis without injuring its host, the human body. Something like that will have to be found for cancer, in Dr. Voegtlin's opinion.

Like Normal Cells

Research by himself and associates has shown that, so far as the need for protein nourishment is concerned, cancer cells are just like normal cells. Cancer growth can be stunted the same as normal growth by withholding certain chemicals, the amino acids which are the building stones for protein tissues and without which no tissue, normal or malignant, can grow.

The cancer cells need the same kind of materials for growth that normal cells do, the studies reported show.

But scientists do not yet know whether cancers need these materials in the same quantities that normal cells do. That now appears to be the crux of the problem. As with all drugs, it is a question of dosage, the quantity of the material. Even in the case of water or ordinary table salt, Dr. Voegtlin explained, there is a dose so small that it is ineffective, another, just right-sized dose that is remedial and finally a dose so large that it is poisonous.

Distribution Important

The question of distribution of chemicals throughout the body must also be considered in searching for a chemical

cure for cancer. There is no reason, Dr. Voegtlin said, why some chemical cannot be found which would be taken up by malignant cells more than by normal cells.

Not Seeking Cure

But Dr. Voegtlin and his associates are not devoting any time at present to searching directly for a chemical to cure cancer. They are approaching the problem in a much more fundamental way. They are first concerned with comparing diseased and normal states. When they have learned all about normal cells and their growth requirements, and how these differ from cancer cells, they will look for a way to change the diseased condition. They sum it up in the conclusion of their scientific report as follows:

"Progress in understanding the chemical mechanisms which regulate the proliferation (growth by multiplication) of malignant tissues depends on further progress in the study of the proliferation of normal tissues."

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DR. W. M. STANLEY



DR. FOREST R. MOULTON

Dr. Stanley received the thousand dollar prize of the American Association for the Advancement of Science for his research erasing the border between living and non-living organisms (See SNL, Jan. 9). Dr. Moulton was elected permanent secretary of the A.A.A.S. at the Atlantic City Meeting. Dr. Moulton is a leading astronomer and has been professor at the University of Chicago. He leaves the Utilities Power and Light Corporation, Chicago, to administer A.A.A.S. affairs. Dr. Moulton succeeds Dr. Henry B. Ward, emeritus professor of zoology of the University of Illinois. The A.A.A.S. council adopted resolutions thanking Dr. Ward for "his long and faithful services and . . . his sincere devotion to the office of the permanent secretary in advancing the cause of science."

PHYSICS

All-Wavelength Broadcast to Probe Earth's Ionosphere

Unique Radio Station, Licensed to Operate on All Frequencies, Sends Regular Signals to Ionosphere

A UNIQUE radio station, which has the only permit ever granted by the Federal Communications Commission to broadcast continuously on all radio frequencies, is in operation at Kensington, Maryland.

The only comparable station in America is that of the National Bureau of Standards where the radio division operates a transmitter by special Presidential decree.

Known as Special Experimental Station, W3XFE, the all-wave transmitter broadcasts only to itself and enables the scientists of the department of terrestrial magnetism of the Carnegie Institution of Washington to bounce radio waves off the electrically-ionized layers scores and hundreds of miles above the earth's atmosphere. A study of these radio reflecting layers, or "mirrors" as they have aptly been called, is disclosing new facts about radio transmission, magnetic storms around the earth, particle emission from the sun and magnetic storms on the sun itself.

You Won't Hear Signals

Even if you own the most modern all-wave radio receiver don't sit up tonight trying to get W3XFE and its "click-click-click" signals. Radio engineers of the Carnegie Institution worked for six months with engineers of the FCC proving that although the Carnegie Institution station broadcasts on all frequencies of police, airplane, commercial and ordinary broadcast radio bands there is no interference with them. And what is just as important for research is the absence of interference of ordinary radio communication with those high-flung radio signals of science.

The Explanation

Why the Carnegie Institution station causes no interference when it is transmitting on a frequency of 660 kilocycles or 980 KC (assigned to stations WEAJ in New York and KDKA Pittsburgh, respectively) is puzzling at first and the answer might be the reply to a seem-

ingly meaningless question, "When is a radio signal not a radio signal?"

In the first place, explained Dr. L. V. Berkner, who installed the station, the radio pulses shot upward to the radio layers of the ionosphere come at the rate of only ten a second. Since this is 50 per cent below the lower limit of hearing, or frequencies which the ear detects as a low-pitched note, the signals—even when heard on the special receiver of the station—are only a series of clicks.

Moreover, the Carnegie station is continually changing frequency from short wave signals of 16,000 kilocycles to long waves with a frequency of 516 kilocycles and passes over its entire range every 15 minutes.

If this seems too involved, Dr. Berkner pointed out that on any radio channel to which you may tune your receiver

set only five tiny clicks lasting a total time of one-half second will occur every 15 minutes.

In addition the special antenna used by the radio station is so designed that a great majority of the radio energy being liberated is going directly upward and even to a nearby receiver just outside the "shock" area of the station there is only an inappreciable signal. Even though such a receiver may be only a mile away from the station any signals it receives have gone upward to the reflecting layer and bounced back. The nearest layer is about 100 kilometers up so that the receiver is really removed an equivalent distance of twice that amount, or about 124 miles.

Receives Own Signals

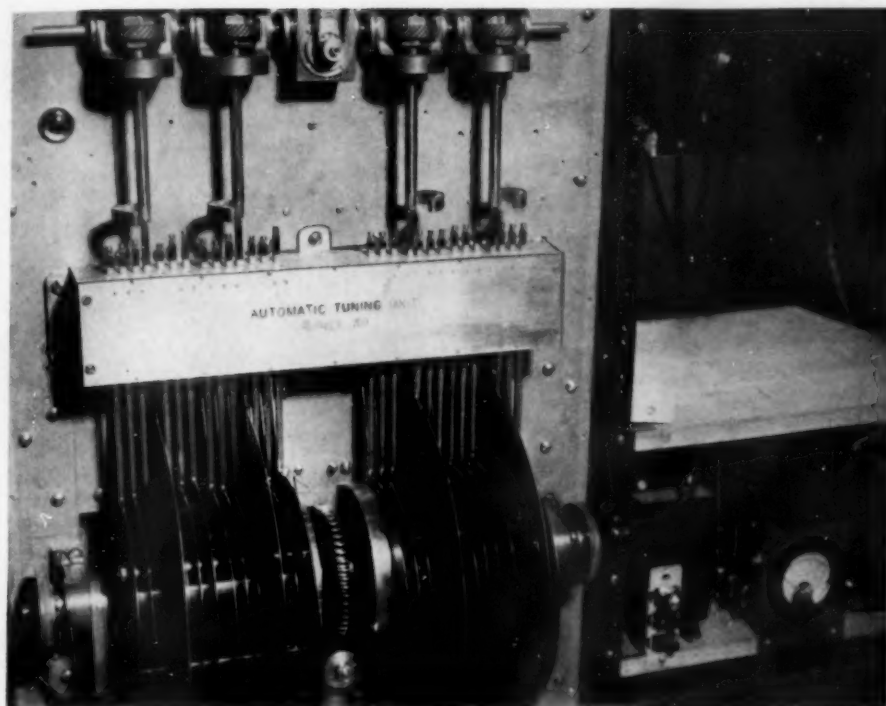
As if these items were not enough, station W3XFE is so designed that its receiving set is electrically interlocked with the transmitter and continuously tunes itself to receive the ever-changing signals.

Those signals, moreover, are of a special kind, having what the radio engineers called decided sidebands. An ordinary radio receiver is designed to cut off such sideband characteristics while the Carnegie station receiver is built so that it is especially sensitive to



ON ALL FREQUENCIES

Dr. L. V. Berkner, Carnegie Institution scientist in charge of studies of radio reflection from the charged layers of the earth's atmosphere, adjusting transmitter of the unique radio station licensed to broadcast on all frequencies.



HEART OF UNIQUE RADIO STATION

Here is the automatic tuning panel of the radio transmitter which sends out, every 15 minutes, signals in frequencies varying from 516 to 16,000 kilocycles.

them. Thus W3XFE, while broadcasting continuously, lives in a radio world all its own.

No Loud Speaker

A visit to the station shows familiar control panels, but no loud speakers or the "da-da-dit-da" purr of a spark transmitter. All reception of the signals from far above the stratosphere is on a photographic recorder which makes a continuous and permanent record of the height at which any given frequency of signal is reflected.

A continuous probing of the radio reflecting layers, known technically as the E, F, F₁ and F₂ layers, has made possible a study of the changing daily pattern of these ionized regions above the earth. Seasonal patterns are also disclosed and the effect of increasing solar activity in the form of sunspots can be correlated with an increase or decrease in the effectiveness of radio transmission on earth.

The scientists of Carnegie Institution are not content to study such profound world-wide changes in the outer limits of the earth's ionized layers from a single station. Similar studies are being undertaken at Huancayo magnetic observatory high in the Andes Mountains of South America and at the Watheroo station, Australia.

To obtain better data and simplified operation of equipment the automatic radio transmitter just described has been built and successfully passed its tests. Installation of such transmitters is now under way at these widely spaced observatories with the hope that other independent and competent laboratories will take up the problem with similar apparatus.

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MEDICINE

Cancer Weapon From Normal Body Tissue

NORMAL, healthy tissue of the body itself may yield an effective weapon against cancer. This possibility appears from experiments reported by Dr. James B. Murphy of the Rockefeller Institute for Medical Research at the cancer symposium held by the American Association for the Advancement of Science.

Dr. Murphy has extracted from various kinds of body tissues a substance which checks the growth of cancers and another substance which stimulates their growth. The work is still in the laboratory stage and has not yet progressed to the development of anything like a practical means of curing cancer. But Dr. Murphy says of his studies:

"The results are definite and leave no

doubt that normal tissue may yield a substance apparently harmless to normal cells which prevents or retards the growth of cancer cells."

From extracts of fowl tumors Dr. Murphy obtained a substance which, when concentrated, neutralized the filterable causative agent of the tumor and prevented the growth of a type of cancer in other animals besides fowl.

A similar cancer-growth-checking substance was found in several active normal tissues. Chief among these tissues are placenta, embryo, skin and pre-lactating mammary gland. Material from these tissues definitely checked the growth of transplanted cancers in laboratory animals and also checked the growth of new cancers that occurred naturally or spontaneously in such animals.

"In the case of one tissue, the pre-lactating mammary gland," Dr. Murphy reported, "it has been possible to separate out both an inhibiting (checking) and a stimulating factor for transplanted cancer."

Dr. Murphy's studies were undertaken on the theory that cancer is the result of a break in the supposed balancing mechanism of the cell which consists of a stimulating and retarding factor. The evidence obtained from his studies cannot, he said, "be considered adequate support for the general hypothesis that malignancy is a break in the internal control mechanism of the cell."

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TECHNOLOGY

Birdproof Windshield Sought by Scientists

SCIENTISTS at the National Bureau of Standards are searching for some new transparent plastic material which will be strong enough to serve as an airplane windshield for those accidents where a bird flies against it. Another need is for a drinking cup material for use in prisons so that lethal weapons cannot be easily obtained as with present heavy crockery.

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A dictionary of American English, dealing mainly with words that have originated in the United States, is being compiled.

A Japanese company is to market a new paint enamel made from urea resin which is designed to withstand heat without discoloring, even up to 150 degrees Centigrade.

ARCHAEOLOGY

Ancestry of the Alphabet Traced to New Source

THE REVOLUTIONARY verdict that we inherit our ABC's from a little-known people of northern Syria—not from the famous Phoenicians of Syria—is announced by Dr. Julius J. Obermann, professor of Semitics at Yale University.

His discoveries, which contradict the familiar school book lesson that our alphabet is traced back through the Greeks to the Phoenicians, were reported before a joint session of the Yale Classical Club and the Linguistic Club.

Dr. Obermann obtained his evidence by study of cuneiform alphabet writings on clay tablets unearthed six years ago at Ras Shamra in Syria.

Ancient Greeks themselves gave the world the impression—wrongly, Dr. Obermann considers—that their alphabet came from the Phoenicians in Syria. The theory has persisted throughout history because no one knew of any other alphabet system Greeks could have borrowed. The Ras Shamra discoveries reveal a people who had an alphabet made by impressing wedge-shaped or cuneiform symbols in clay, as early as the second millennium before Christ. Dr. Obermann's study of this alphabet shows significant links relating it to the Greek alphabet by ancestry.

The Greeks, he explains, borrowed an archaic form of this Semitic alphabet and preserved it. Meanwhile, the Semitic

alphabet changed and developed in its home country and evolved into the form used by the Phoenicians, the Moabites, and the Hebrews.

Tracing the alphabet to Ras Shamra ancestry dissolves difficulties that have perplexed alphabet historians. As an example, Dr. Obermann cited the point that Greeks employed many more symbols than Phoenicians did in their alphabet. How to account for the so-called non-Phoenician elements was a problem. But, he said, these elements can be shown "one and all to be present in the cuneiform alphabet from Ras Shamra."

Another discrepancy in efforts to link the Phoenician with the Greek alphabet was the fact that Greeks used more alphabet symbols for phonetic values than Phoenicians did. Such discrepancies in function disappear when the Greek is compared to the Semitic writings from Ras Shamra, he stated.

The tablets preserving the long-lost cuneiform alphabet of Ras Shamra are the sacred literature of a Semitic kingdom known to have flourished in Syria in the north of the land of Canaan. Ras Shamra stands where the kingdom had its ancient center.

In adapting the cuneiform characters impressed into soft clay to a technique of writing with a blunt instrument on a hard surface, the Greeks, and the Phoenicians as well, made certain necessary changes, now explained.

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acid. This acid helps the body get rid of certain kinds of poisons by a chemical process of detoxification. The body gets its supply of the acid from food and from its own protein building blocks. When there is poison in the body, all available glycuronic acid will be used to detoxify the poison, and if the food source of the acid is low, none of the acid will be left over for mucin production. This leaves the stomach and digestive tract unprotected.

Animals deprived of a food source of glycuronic acid and given menthol soon showed signs of poisoning, Dr. Manville found. Those animals which survived the poisoning for two to four days were examined after death and found to have ulcers in the stomach, gall bladder, pylorus and both large and small intestines. These ulcers resembled markedly those occurring in vitamin A deficiency.

Liver Affected

Glycuronic acid does its detoxifying job in the liver, so any damage to that organ will predispose to an earlier appearance of damage to the mucous surfaces, Dr. Manville points out. He believes that vitamin A is involved in this mechanism, but the exact connection between the vitamin and the detoxifying acid and the development of ulcers cannot be explained without further investigations.

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MEDICINE

Connection Found Between Vitamin and Poison Protection

A CONNECTION between vitamin A and a mechanism for protecting the body from poisons is suggested by experiments reported by Dr. Ira A. Manville of the University of Oregon Medical School. (*Science*, Jan. 9.)

One of the signs of vitamin A deficiency is damage to mucous tissues such as line the inside of the eyelids. The same sort of change, Dr. Manville

finds, occurs in the mucous lining of the digestive tract when vitamin A is lacking in the diet. There is an actual decrease in the mucus-secreting cells, and the stomach and other parts of the digestive tract are consequently more easily injured, with ulcers and erosions resulting.

Mucin, which protects the lining of the stomach, has for one portion of its molecule a substance called glycuronic



MAKING JOJOBA OIL

Dr. Robert S. McKinney, U. S. Department of Agriculture caught in action in his laboratory making oil from the jojoba nut seeds such as those shown on the facing page.

BOTANY

**Shrub Rivals Whale
In Producing Prized Oil**

OIL very much like the prized sperm-oil of the whale in certain chemical and physical properties is produced from the seeds of a shrub that grows in the Southwest and in Mexico, chemists of the U. S. Department of Agriculture have discovered. The plant's name is spelled jojoba by the Mexicans, and is pronounced hohoba. Botanists say it is distantly related to the boxwood, and give it the Latin title *Simmondsia Californica*.

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ENTOMOLOGY

**Find That Mosquitoes
Winter in Twilight Caves**

BEARS are not the only beasts of prey that spend the winter in caves. Animals much smaller than bears, but much more likely to bite the average citizen, to wit: mosquitoes, also hibernate in natural caverns, Prof. J. D. Ives of Carson and Newman College, Jefferson City, Tenn., reported.

With the aid of personnel from F.E.R.A. and N.Y.A., Prof. Ives explored a number of Tennessee caves during fall and winter months, and found a total of more than 3,000 of the insects. Almost all of them were females, and the great majority belonged to the genus *Anopheles*, notorious as malaria carriers. Relatively few, however, belonged to the particular species that is the worst offender in this respect; most of them belonged to a species that prefers the blood of cattle to that of human beings, though even these are capable of transmitting malaria on occasion.

In Twilight

Practically without exception, Prof. Ives and his workers collected their mosquitoes in the twilight zone of the caves, where full daylight does not penetrate, yet where it does not become pitch-dark. This is the kind of light many species of mosquitoes prefer; and the twilight zone also gives them the degree of air humidity they like best. Altogether, then, caves offer good homes for mosquitoes.

Prof. Ives suggested methods of spraying that might be worth trying, where caves harboring mosquitoes are too near human habitations.

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**RIVAL OF THE WHALE**

From these native jojoba nut seeds can be extracted a non-fatty oil resembling that of the sperm whale very closely. The nuts are found in Arizona, Southern California and Western Mexico, where they grow on bushes from three to 15 feet high.

AERONAUTICS

**Records Loads on Airplanes
During Gusts in Bumpy Flight**

A DEVICE that automatically records the ups and downs of a bumpy airplane flight has been developed by the National Advisory Committee for Aeronautics, it was revealed to the Society of Automotive Engineers meeting in Detroit.

Research engineer Richard V. Rhode of the NACA laboratories at Langley Field, Va., disclosed the operation and recording of his so-called V-G recorder which shows the simultaneous effect of air speed and the acceleration of gravity during a gusty flight.

To airplane passengers such a bumpy flight often produces air sickness and nausea but to the airplane designer it means a more serious constructional problem. During a gusty "bump" the loads on the plane increase and decrease rapidly and powerfully. Some knowledge of how large these bump factors are must be obtained to permit a safe margin of strength to be built into the

plane. And at the same time too much strength, with its accompanying weight, is not wanted, for present-day planes have to be economically profitable to operate.

By an ingenious coupling of levers which activate a stylus rubbing on smoked glass, the NACA recorder gives a permanent record of how the effect of gravity combines with air speed. In both land transports and seaplanes the device has now taken records for over 20,364 hours in the air and traveled over 3,500,000 miles in doing it.

It is found that while the ups and downs of fairly smooth flight seldom exceed an additional half G (half the pull of gravity) either plus or minus, there may be times when a plane is riding through a squall storm that the additional acceleration may rise to 3 G or more. It appears that these larger values are obtained at speeds of about 180 miles an hour. (Turn to page 45)

ZOOLOGY

**Honey-Tombed Squirrel
In Nest of Wild Bees**

BITTER DEATH, with sweet entombment after, was the fate of a venturesome squirrel that somehow got into a bee tree in Bedford County, Va., reports Prof. Ruskin S. Freer of Lynchburg College.

The little animal's body was found by J. B. Watson and Horace A. Watson of Moneta, Va., when they opened up the bee tree to get the wild honey. The squirrel had evidently died in great agony, for its limbs were drawn up convulsively.

The avenging bees had removed everything they could of this invading monster, for the body had been stripped of hair, and its viscera were all cleaned out. But the muscles, bones, and connective tissues were apparently too tough for the bee workers, and so the mummified squirrel was left entombed and sealed over in a mass of honey.

When first taken out, the body was white like unfinished wood, the finders reported. They kept it on a shelf in a farm shop for a long time, but the only change that took place was a darkening of the flesh.

How well bee-embalment worked is attested by the fact that the dead squirrel was found in the summer of 1928, and turned over to Professor Freer in good condition only a few weeks ago.

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CHEMISTRY

**Textile Makers Developing
Man-Made "Cotton" Yarn**

SUDDENLY come to life is a textile yarn known for some time to man, but long neglected—rayon staple. It's man's closest approach to yarn made from cotton fibers.

Germany and Italy in their quest to become nationally self-contained and to do away with the importation of cotton are turning to rayon staple. Japan, home of natural silk, yet one of the world's greatest producers of artificial silk, is energetically developing the newer fiber. The motive in the east is not so much for self-sufficiency as with an eye to capturing world markets which rayon staple is now opening up.

England is turning to rayon staple with the hope that it will make idle cotton machinery hum again. Also for the development of interesting and

novel fabrics. So, too, are U.S. textile producers.

What is staple rayon? Really chopped up artificial silk threads.

Ordinarily, artificial silk fabrics are made from long continuous threads spun from a chemical solution of wood, or of cotton linters, by machines which are truly mechanical silkworms. What the staple yarn manufacturer does is to take these long threads and cut them up in short lengths, usually anywhere from two to seven inches. This gives fibers like the fibers in a cotton boll.

These staple lengths, like cotton fibers, can be carded and spun into yarn on ordinary cotton spinning machinery. When woven or knitted the spun staple yarns produce soft, beautiful fabrics that drape extremely well.

To make unusually interesting fabrics, the staple lengths may be blended with wool fibers or with cotton fibers. Such yarns give novel dyeing effects. Besides, large savings in cotton and wool are made, and new fabrics created.

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ENGINEERING

**Submerged Power Plant
Built in North Germany**

A HYDRO-ELECTRIC power plant built entirely under water is the new and unique boast of the town of Rostin in Pomerania. There is no powerhouse on the bank, no visible structure anywhere; everything lies in midstream below the dam, and the electricians come and go through tunnels. (*Umschau*, Dec. 6.)

The underwater powerhouse is a by-product of a flood problem set by the Persante River. Its early spring freshets, bearing rafts of battering ice, formerly flooded many acres of fertile land. To reclaim this land the river's meandering course was straightened and shortened, and a low dam was built near Rostin.

The dam suggested power development, though no great head of water was available. Furthermore, if a powerhouse of conventional type were set up it would be a target for the spring ice jams. So the powerhouse was set on the river-bed on the downstream side of the dam, with its roof gradually sloped to permit flood-water, ice, and floating debris to slide harmlessly over the top.

In order to exploit fully the low head of water, the axes of the turbines are not set vertically as in most hydroelectric installations, but are almost parallel with the direction of the current.

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IN SCIENCE

SEISMOLOGY

**Scientists Find "Lost"
Earthquake in Tibet**

THE "LOST" Asiatic earthquake of Thursday, Jan. 7, was located in Tibet by scientists of the U. S. Coast and Geodetic Survey, working on data collected by wire and radio by Science Service. Its epicenter was in approximately 35.5 degrees north latitude, 97.5 east longitude. This is in the general region of the Kwen Lun mountains, and apparently in an uninhabited or sparsely inhabited region. The disturbance was exceedingly severe, so that if it had occurred in any large settlement death and property loss would have been heavy.

Fourteen seismological observatories in the United States, Canada, the Philippines and China supplied the data. They are as follows: Pennsylvania State College; Seismological Observatory, Pasadena, Calif.; Franklin Institute, Philadelphia; University of Montana, Butte; Des Moines, Iowa, Seismological Observatory; the Dominion Meteorological Observatory, Victoria, B. C.; the Manila, P. I., Observatory; the observatories of the Jesuit Seismological Association at St. Louis University, Canisius College, Fordham University, and Zikawei, China; the observatories of the U. S. Coast and Geodetic Survey at Tucson, Ariz., Sitka, Alaska, Honolulu, T. H., and Chicago, Ill.

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ARCHAEOLOGY

**Loan Shark in Egypt
As Long Ago as 109 B. C.**

AN EGYPTIAN promissory note demanding payment at 100 per cent interest reveals that "loan sharks" existed as early as 109 B. C.

The note, written in elaborate legal terms, has been translated for the Field Museum of Natural History by Dr. N. J. Reich, Egyptologist. The note deals with the loan of wheat by a woman to a peasant slave, and binds the borrower to such terms as "everything that I now possess or shall acquire is herewith pledged to Nekhutes until I have discharged my debt in full."

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EN FIELDS

PALEONTOLOGY

Titan-Beast Fossils Found in California

THE nearly complete fossil skull of an entirely new kind of extinct titan-beast, or Titanotheres, recently found in the Death Valley region of California, is reported to the National Academy of Sciences through its official *Proceedings* (November), by Dr. Chester Stock of the California Institute of Technology. The animal's head in life must have been nearly three feet long, for the skull has an over-all measurement of about 28.5 inches. It was found in a geological stratum of Oligocene age, estimated at approximately fifty million years ago.

The Titanotheres were giant, heavy-bodied animals, with no near living relatives. They resembled rhinoceroses more closely than any other modern animals, but had their two horns side by side on their noses rather than "in line." Dr. Stock has given his new titan-beast the scientific name *Protiitans curryi*.

Science News Letter, January 16, 1937

ENGINEERING

Television Range Finder Gets "Bead" on Ships

A TELEVISION range finder which would automatically reveal the position and range of enemy ships so that mighty defense guns could be directed with unerring accuracy to blow them up, is described in a patent (No. 2,056,216) granted to R. H. Somers, James L. Guion, both of the U.S. Army, and James C. Karnes, of Buffalo, N. Y.

The novel range finder is intended to eliminate any human error and may be used on battleships or on land. It comprises two television cameras spaced a known distance apart.

The cameras are connected electrically to a television receiver where the scenes picked up by the cameras are thrown on view plates. The observer automatically regulates the television cameras to sweep the field so that they are both directed at the same target, which may be an enemy ship.

The device would be adjusted until the images of the ship appearing on the view plates of the television receiver exactly overlap. This means he has a "bead" on the ship.

To get the range, the observer merely has to glance at a chart. Upon this the information has been continuously indicated by a plotting device which acts in synchronization with the "focusing" of the cameras to plot automatically the exact range and azimuth bearing for the guns.

Science News Letter, January 16, 1937

ENGINEERING

Maybe It Should Be Called the Copper Horse

ALTHOUGH the steam locomotive has long been known as the "Iron Horse," each large one contains nearly 8,000 pounds of copper or its derivatives. (*Copper and Brass Research Association Bulletin*, December.)

Science News Letter, January 16, 1937

PALEONTOLOGY

Ancient Corpse's Last Meal Under Microscope

THE LAST meal of a corpse many centuries old, found in a bog where acid water had preserved the body against decay, has been made the subject of scientific examination by Prof. Fritz Netolitzky of the University of Czernowitz, Poland. (*Forschungen und Fortschritte*.)

A sample of the contents of the digestive tract, on microscopic study, proved to consist mainly of rye and millet, both very badly threshed and ground. There were also traces of some kind of a pod vegetable, possibly peas.

Professor Netolitzky's somewhat macabre research is regarded as of real scientific importance in connection with the history of grain cultivation in northern Europe in prehistoric time.

Science News Letter, January 16, 1937

ENGINEERING

Device Splits a Second Into 100,000 Parts

AN electron-tube device which splits a second of time into 100,000 parts is one of the tools used by W. A. Ford of the General Electric Company to operate a precision time and frequency system.

Science News Letter, January 16, 1937

PUBLIC HEALTH

Flu is Widespread But Only Moderately Severe

EVIDENCE of a widespread increase in influenza throughout the country appears in reports of state health officers to the U.S. Public Health Service. For the week ending January 2, latest reported, a total of 3,993 cases were reported.

This figure is believed to be far below the actual total number of cases, but since it is an increase of about a thousand over the number of cases reported the preceding week, it indicates a considerable rise in the incidence of the disease.

Health authorities term the epidemic as "moderately severe," and point out that it is still far below the epidemics of 1928 and 1932 when cases were reported at the rate of a hundred thousand a week for several weeks.

No one, however, cares to hazard a prediction as to how severe this outbreak may become or how long it will last.

Science News Letter, January 16, 1937

CONSERVATION

Ptarmigan Decrease in Alaskan National Park

A DECLINE in the number of ptarmigan noticed in Mount McKinley National Park, Alaska, is accounted for by old sourdoughs—adventurous souls who followed the lure of gold and fortune generally to Alaska and stayed there to become old-timers—on the ground that about every seven years the ptarmigan disappear. The sourdoughs do not pretend to be biologists, and cannot tell why the birds leave or where they go—it just happens every seven years or so, they say.

Whatever the cause or the destination, there is a noticeable decrease in the number of ptarmigan in Mount McKinley National Park this season over the past three years, according to Harry J. Lick, park superintendent. It may be, he says, that the birds had a poor nesting season, or that the young may have been killed by predators before they were large enough to protect themselves. At any rate, close observation will be kept on the ptarmigan and their habits throughout the winter by park authorities, to determine the cause of their decrease.

Science News Letter, January 16, 1937

ENGINEERING

Out of the White

Job of Getting Highways Free of Drifts That Rise Up to 80 Feet Keeps Plows Busy; Snow Fences Ready

See Front Cover

WHEN winter settles down upon the highways of thirty-six states which make up America's great snow belt, an army of plows begins the annual battle against the blockade of the national transportation system, and ten thousand miles of snow fence are standing guard against the onslaught of snow-laden gales. So indispensable has become the unimpeded movement of an endless caravan of motor vehicles in the delivery of goods and passengers to otherwise isolated communities that winter maintenance is now a function of tremendous public consequence, and a problem which the highway engineer must face intelligently and stubbornly.

The good roads movement, which started with the cry of "get us out of the mud," has in many localities been supplanted by the "open roads" movement and the cry of "get us out of the snow." In some states to answer this cry means that the plows never cease to operate from one end of the winter to the other, except to stop for fuel or repairs. For twenty-four hours a day these faithful servants of the highway pass back and forth on their endless journey, cutting through the drifts again and again as fresh-falling flakes or whirling clouds of white obliterate what has been accomplished with such difficulty and expense.

Eighty Feet Deep

The motorist who is so helpless in his efforts to combat a snowfall of only a few inches can scarcely conceive of encountering drifts eighty feet deep. But on the famed Rim Road encircling Crater Lake in Oregon such giant drifts are not uncommon, but because they interfere in no way with the nation's commerce they are not disturbed until the month of June, when tourist traffic must be provided for. At this time of year springtime thaws have reduced the drifts to comparatively modest heights, but there is still thirty feet of hard-packed snow with the consistency of ice, and this must be blasted with dynamite before the propellers of the heavy rotary plow can hurl the remains into the air and down the mountain-side.

So tremendous has been the task of opening these Oregon roads that one year it was late in August before traffic was finally able to pass, and a snowstorm the following week closed the road again for the winter.

Preparedness

It is a well known axiom in the business of snow removal that preparedness is half the battle, and when storm warnings are hoisted there is great advantage in having both operators and equipment standing by in readiness to go into action with the storm. For this reason there is need for constant communication with the Weather Bureau, and for an intelligent distribution of plows throughout the area patrolled. In the mountainous sections of Washington, where depths of snow vary from 18 to 48 feet, the rotary outfits are equipped with two-way short-wave radios, and communication is maintained with the base station in order that reports of weather conditions and emergencies

such as snow-slides may be received and sent.

Preparedness also requires that there be immediately available a sanding crew who can arrive without delay at positions which are reported to be endangering traffic with ice formation. It is customary for the highway department to transport quantities of abrasives such as cinders or coarse sand, and leave them in stock-piles along the road before the arrival of winter. Trucks will then have fresh supplies near at hand, and speed in covering the danger spots will be possible. The addition of calcium chloride or salt has been found beneficial in this part of the snow program, provided the chemicals are used with due precaution against possible action on the pavement, since the consequent melting of the ice allows the gritty substance to become firmly embedded in the road surface. This not only increases traction, but prevents the wind from blowing the sand away.

Prevent Drifts

Of all methods used to prepare for the battle against snow drifting, the best is that of trying to prevent drift forma-



THROWING IT UP

The propellers of the rotary plow hurl the snow high into the air and back from the traveled way.



STANDS GUARD

A vertical-slat snow fence piles up snowdrifts before they can barricade Bert-houd Pass, Colorado. Photograph through courtesy of the U. S. Bureau of Public Roads.

tion. An ounce of prevention in the form of snow fences is worth many tons of heavy plows. It has been observed that snow drifting occurs on the highway when there are buildings or fences or certain types of bushes close to the right of way. These are all types of wind barriers which slow the velocity of the snow-laden gale and force it to deposit its load. Such observations led to the erection of wind obstructions in the proper places, so that the drifts of snow, which form on the leeward side of the object, will pile up away from the road.

At Michigan State College tests of drift control by means of artificial snow fences were made in a wind tunnel ten feet long, sawdust and mica flakes being used for snow. The floor of the tunnel was laid with sandpaper to produce as nearly as possible natural ground conditions. Wind velocities as high as 45 miles per hour were generated by propellers, and miniature snow fences erected across the tunnel.

Best Proportions

Observation of the sawdust and mica drifts formed by various types of fence revealed that the width of the slats in the open-type fence should be approximately the same as the spaces between slats, both for the horizontal and vertical fences. For each foot of fence height there should be about fifteen feet of distance from the roadway; that is, an ordinary four-foot fence should be sixty feet back from the highway. It was also found that when raised about six inches from the ground and inclined with the

wind, a snow fence will be kept free of snow at its base, and will be able to pile up drifts twice its own height.

Snow fences are ordinarily made of wood, though galvanized metal is not uncommon, and they are usually of the open type except on narrow rights-of-way where solid fences are sometimes used to pile up drifts on the windward side. The problem of storage during the summer is an important one, and entails a large proportion of the total cost of the fence. It is complained that if the frames are piled at the side of the road instead of in storage houses, well-meaning neighbors use them for kindling wood and house repairs, or they will be found the following autumn serving as pens for babies or pigs.

Tree Barriers

The prevention of snow drifting was studied a good number of years ago by the railroads, and instead of using artificial control methods, natural barriers of trees were planted to keep the tracks clear. Today the widespread interest which has been aroused in highway landscaping has given prominence to this natural barrier method of snow control which at the same time can be made a part of the roadside beautification program. Where trees are already close to the road, pruning them to proper heights to allow the wind to blow unimpeded across the road has been of advantage in the creation of a sweeping action.

New plantings may be made in the form of hedges of trees or shrubs which will deposit the snow on the windward

side like the solid artificial barrier, or they may be spaced farther apart to simulate conditions with the open-type fence. Several rows of parallel plantings will create a reservoir which will hold the snow. Among the natural barriers which have proved successful in snow control work, conifers such as pines, spruces and cedars have given good results. Low, spreading shrubs are also used in combinations, and include bushy willow, barberry, box-elder, and buck-thorn.

New Road Design

An important method of snow control is in the actual design of new roads and their location. Where the ground is flat, the level of the road should be above that of the surrounding country by an amount equal to the expected snow line during the winter. In western states this method has been widely adopted on new construction projects, eliminating the trench-like reservoir which resulted from plowing a highway beneath the surrounding snow line. Ample space should be allowed for storing the snow along the side of the road by the provision of wide shoulders and shallow ditches, whereas shallow cuts should be avoided, and slopes should be flattened and planted with shrubs that will catch the snow and prevent slides.

A considerable variety of snow-fighting equipment is in use in the various regions of the snow belt. Today the trend seems to be toward the lighter, faster types, such as the ordinary blade plow and truck. When the snow is heavy, however, the lighter plows are used to follow up the tractor plows. The latter are often of the V type, pushing the snow to both sides. Tractors can get through eight to ten feet of snow, if it is not wet, and if depths are greater the plow is raised and the tractor allowed to travel over part of the snow to make a first cut.

Last Resort

The rotary plow is in most cases considered a last resort in the attempt to open a road, but when trucks must hit the drifts to get through, it is much more economical to use the heavy, slow equipment, for breakage of the smaller plows and trucks runs into considerable money. Rotary plows are equipped with propellers whose whirling action hurls the snow to the side of the road, the snow ascending as high as forty to fifty feet into the air. On city streets snow loaders are used to remove the accumulations piled up at the gutters, this being accomplished by a belt conveyor onto

which the snow bank is forced by the forward movement of the self-propelled loader. The snow is elevated on the belt and dumped into waiting trucks.

The clearing of city streets, to be effective, must be accomplished before traffic has been able to compact the snow too hard for the plows to take hold, and before a drop in temperature turns slush into solid ice. It is for this reason that New York City may hire 100,000 men and spend as much as a million dollars in one day's snow removal of only a few inches.

The question has been asked whether there is justification for the tremendous outlay of money for snow control and snow removal programs. Studies have been made of the increased gasoline tax revenues which have been received in recent years when highways have been kept open during the winter. Comparison of expenditures and tax receipts reveal that snow removal operations actually produce a profit for the highway fund. But receipts from gasoline taxes are a minor item compared to the economic importance of assuring all-year-round transportation by motor vehicles.

Health Value

Moreover, the snow removal program promotes the health and safety of those living in otherwise inaccessible places. On this we cannot set a monetary value. Finally, the highways of the Nation represent an enormous capital investment, as do also the 26 million vehicles which move over them, and to have a very large percentage of both these investments idle during three or four months of the year would entail an economic loss which in comparison with the cost of keeping the transportation system functioning would be enormous.

With the increased use of closed cars, insulated bodies, and automobile heaters,

highway travel in winter has become as comfortable as in the summer months, and scientific attack upon snow problems has been forced to keep in stride with the motorist's demand that roads be not only passable, but that travel be made swift and, as far as possible, free from hazard.

New Trends

Whereas a few years ago almost the total expenditure and effort applied in the winter maintenance program was for the removal of snow as it lay on the highway, the trend has now definitely become one of preventive steps before the snow arrives, and safety measures after it has been cleared away. The study of drainage control has been found of special importance in keeping melted snows off the traveled way, and attention is being given to the roadbed beneath the pavement to prevent subgrade water from seeping through the pavement joints and freezing on the surface.

Adequate facilities for weather prediction and reporting are looked upon as a prime essential, and study is made in the various localities of a single snow removal region to ascertain local conditions of the direction of prevailing winds, wind velocities, temperature ranges, and figures of winter precipitation. Attention is also given to methods of snow removal which will cause least damage to the pavement, and construction methods which will eliminate as far as possible the destruction of roads by frost heaving and faulting in the spring.

Dangerous conditions developing as a result of sleet storms and the freezing of drainage from melting snow banks are lessened by the erection of guard rails, but since the wooden type rail was found to act as a snow fence which deposited drifts on the roadway,

new guard rail installation is of the wire cable type.

The opinion so often voiced by old-timers that we no longer have the winters we used to experience would be contested by the highway engineer. For winter still piles up what appear to be insurmountable drifts, and sub-zero weather still makes removal a task for only the red-blooded men on the maintenance crews. Last winter, record snowfalls in all parts of the country sounded a warning to the highway profession that equipment must be up-to-date, and that the snowplows available must be of the type and size suitable in the locality where it is stationed or it will be of no more consequence than "two small boys throwing snowballs."

Science News Letter, January 16, 1937

SAFETY ENGINEERING

Foolproof Hood Saves Welder's Eyes

TO PROTECT the eyes of the welder from the blinding light of the electric welding arc—construction industry's most important "knitting needle"—a Lexington, Ky., inventor, H. F. Montague, has invented and just obtained a patent (No. 2,058,169) for a new type of foolproof welder's hood.

The instant the wearer of such a hood touches the piece of metal with the welding rod, a protective screen instantaneously covers the window of the hood to filter out the blinding rays that would otherwise reach the welder's eyes. The moment he lifts the rod—stops welding—the screen snaps away from the window so that without tilting or lifting the hood the welder can inspect the work.

Operation of the screen is made automatic by special electric mechanism in the hood, which is controlled by the current that operates the arc.

Science News Letter, January 16, 1937

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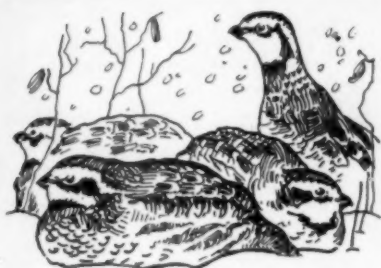
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2101 Constitution Ave. Washington, D. C.

WILDLIFE

NATURE RAMBLINGS

by Frank Thone



Wildfowl of Your Own

NOBLEMEN and royalty of old times gloried in their great private game preserves, the forests and moors that made up considerable parts of their holdings, in which they alone had the right to hunt deer and boar and other game. And woe to the wight of low degree who was caught a-poaching!

The right to the game that lives on the land inheres with the ownership of the land. Exception is made of migratory game, principally waterfowl such as ducks, geese, and swans. For these there are elaborate protective codes, even international treaties.

But upland game, such as bobwhite quail, grouse, and the imported pheasants, stay within comparatively limited range under normal conditions, often not leaving the farm or timberlot that is their "home." They are not as domestic as hens, to be sure, but they are not much wilder than many flocks of turkeys which farmers call their own.

They do require a little care, in consideration of their willingness to live on your land. But it is really very little. Give them some brushy patches for shelter, let some berry- and seed-bearing shrubs grow, in extreme winters scatter a little charitable grain—that is all they

ask. And in reason and in season, they are yours for the shooting. No man may hunt them on your land without your permission. Many landowners, having thus encouraged upland game birds to live on their property, become so fond of them that they have not the heart to shoot them or permit them to be shot.

This kind of game farming has recently become a pleasant and profitable side issue of the great national task of soil conservation. Farmers who have conquered gullies that were eating away their sloping lands hold the soil against further washing by planting it with shrubs and low trees. These offer congenial shelter for the wild birds, and if the planted species are properly selected yield winter food as well.

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From Page 39

or the cruising speed of modern transport planes.

Comparison of records over land and over the ocean on the trans-Pacific flights shows that the previously noted smoothness of the latter flight is a scientific reality.

Partly this is due, declared Mr. Rhode, to the lesser turbulence of air over large bodies of water but it is also due to the wider latitude of flight, both in direction and altitude, which the seaplanes enjoy. They intentionally dodge rough weather and often come down near the sea to get under the bumps.

Science News Letter, January 16, 1937

GEOLOGY

Seaweeds Form Great Rocks In North America

SEAWEEDS are responsible for the formation of many massive rocks in the older strata of North America, the Paleontological Society was told at its meeting, by Dr. Carroll Lane Fenton and Mrs. Mildred Adams Fenton.

Many seaweeds even today are great gatherers of limestone, which they extract from sea water and deposit as shell-like crusts about their bodies. Some seaweeds of this type are often superficially so like corals that many persons mistake them for these animals.

It is difficult to identify some of these seaweed-deposited limestones, Dr. Fenton said, because they form a maximum of lime and leave a minimum of plant traces. Nevertheless, he and Mrs. Fenton have been able to make out certain form-species that appear to be alike in

widely separated regions, such as the Grand Canyon, Minnesota, Montana, and Pennsylvania.

Worms, also, can slowly build mighty rocks. Drs. B. F. Howell and John F. Mason of Princeton University described reefs in certain California strata, formed entirely of the limy tubes in which, ages ago, lived crowds of the marine worms known to science as *Serpula*.

Clays Tell Sea Canyon Story

Investigations of the great submarine valleys of Georges Bank, northeast of New England, were reported by Prof. Henry C. Stetson of Harvard University. Dredgings yielded specimens of hard sandstone from two hitherto unknown formations in the canyon walls. Many samples of stiff clay were brought up, containing skeletons of microscopic animals of present-existing types.

The expedition also used the core-taking device recently perfected by Dr. C. S. Piggott of the Carnegie Institution of Washington, which shoots a steel tube into the bottom from a kind of small cannon. Samples of the same kind of clay were taken from the bottom at depths of nearly 6,000 feet. Prof. Stetson regards these clays as fill material.

Science News Letter, January 16, 1937

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PHYSICS AT WORK—Prof. George B. Pegram of Columbia University.

In the Science Service series of radio discussions led by Watson Davis, Director, over the Columbia Broadcasting System.

•First Glances at New Books

Additional Reviews
On Page 48

Electricity

ELECTRICITY—W. L. Bragg—*Macmillan*, 272 p., illus., \$4. From his lectures for young people at the Royal Institution in 1934, Nobel Prof. Bragg has prepared this book with its simple title. Mathematics is avoided but technical terms are used, being explained on the first occasions when they occur. He feels—and there are many who agree with him—that attempts to write popular science without technical terms are about like describing a football game without using words like “ball,” “punt,” “center,” “end” and “forward pass.” After a brief summary of what science has discovered about electricity he turns to the applications in power transmission, motors and dynamos, power generation, telephones and telegraphs and the oscillating circuits and vacuum tubes which make radio possible.

Science News Letter, January 16, 1937

Chemistry

THE MARCH OF CHEMISTRY—A. Frederick Collins—*Lippincott*, 290 p., illus., \$3. With 28 previous books to his credit, Mr. Collins is one of America's most prolific writers of applied science books of the beginners', experimental or how-to-understand type. Here he turns a description of the more recent developments in theoretical and applied chemistry with less sureness than in some of his previous works. More thought and care in the illustrations—both drawings and photographs—would have added interest.

Science News Letter, January 16, 1937

Medicine

TOXICOLOGY, OR THE EFFECTS OF POISONS (3d ed.)—Frank P. Underhill—*Blakiston*, 325 p., \$2.50. This text for medical students by the late Dr. Underhill has been revised and brought up-to-date by Dr. Theodore Koppanyi of Georgetown University School of Medicine.

Science News Letter, January 16, 1937

Mathematics

AN INVITATION TO MATHEMATICS—Arnold Dresden—*Holt*, 453 p., \$2.80. This book is the answer to the growing trend of colleges to drop mathematics as a required subject. The author points out that whatever a mathematician must think about this “dropping” of his pet, there must be something the matter with the pedagogy. In a hurried trip from algebra through geometry and on to

calculus the applications of the methods to realities are stressed, and along with what the author admits may in parts be unorthodox mathematical writing are interposed some 500 problems for those people who really want to take the bit in their teeth and learn some math.

Science News Letter, January 16, 1937

Almanacs

1937 FRANCISCAN ALMANAC—*St. Anthony's Guild*, 556 p., 50c. Although published primarily for giving condensed data on religious topics, this new almanac contains a surprising variety of scientific, historical, and educational information as well, much of which is not obtainable in other publications of the same general class.

Science News Letter, January 16, 1937

Engineering

THE PROFESSIONAL ENGINEER—Esther Lucile Brown—*Russell Sage Foundation*, 86 p., 75c. A monograph dissecting the economic status of the engineer; what he earns, when, what he has to study, where he works, and what fields of work he may wander into after his technical education. A compact social study of the engineering profession.

Science News Letter, January 16, 1937

Traffic

SENSE AND SAFETY ON THE ROAD—Robbins Battell Stoeckel, Mark Arthur May, Richard Shelton Kirby—*Appleton*, 299 p., illus., \$1.50. A commissioner of motor vehicles, a psychology professor and an engineer join forces to present the comprehensive picture of the complex problem broadly grouped under traffic. Intended for the average reader, the book clearly brings forward the seriousness of the traffic situation in its many aspects and in the end outlines a 17-point program of improvement.

Science News Letter, January 16, 1937

History of Science

SCIENTIFIC INTERESTS IN THE OLD SOUTH—Thomas Carey Johnson, Jr.—*Appleton-Century*, 217 p., \$2.50. An interesting and valuable contribution to the history of science in America. The University of Virginia's associate professor of history has made a study of the attitude of the planters, politicians and professional men of the Cotton Kingdom and of their wives and daughters toward the natural sciences. The ante-bellum South, he finds, displayed a genuine and eager interest in science.

Science News Letter, January 16, 1937

Physics

THE NATURE OF PHYSICAL THEORY—P. W. Bridgman—*Princeton Univ. Press*, 138 p., \$2. Harvard University's well known experimental physicist looks at the modern scientific scene in his field and sets forth his thinking on what it all means in its philosophical aspects.

Science News Letter, January 16, 1937

Economics

PRICES IN RECESSION AND RECOVERY, A SURVEY OF RECENT CHANGES—Fredrick C. Mills—*Natl. Bur. of Economic Research*, 581 p., \$4. Dr. Mills rounds out a study of prices which began with *The Behavior of Prices*, published in 1927, and *Recent Economic Tendencies*, published in 1932.

Science News Letter, January 16, 1937

Editorial Work

PREPARATION OF SCIENTIFIC AND TECHNICAL PAPERS (3d ed.)—Sam F. Trelease and Emma Sarepta Yule—*Williams & Wilkins*, 125 p., \$1.50. A handbook of fundamental usefulness to those who create the record of science.

Science News Letter, January 16, 1937

Photography

YOU AND YOUR CAMERA—Eleanor King and Wellmer Pessels—*Harper*, 63 p., plates, \$1.75. This book strikes an important point in modern amateur photography for it concentrates less on *how* to take a picture than on *what* to take in a scene. Herein lies the difference between the snapshots of a summer vacationist and the professional angle pictures which spread through the better magazines and in the rotogravure sections of the paper. A survey of the illustrations shows the emphasis on lights and shadows, and always angles and angles.

Science News Letter, January 16, 1937

Engineering

HIGH-SPEED DIESEL ENGINES—L. H. Morrison—*Amer. Technical Soc.*, 243 p., illus., \$2.50. A practical textbook for future diesel engineers and mechanics and for those who have been thinking of buying a diesel engine for their business.

Science News Letter, January 16, 1937

Mathematics

ELEMENTARY ANALYTICAL CONICS—J. H. Shackleton Bailey—*Oxford*, 378 p., \$2.75. A British text designed to outline the fundamentals needed to pass Higher Certificate Examinations and other education awards in Great Britain.

Science News Letter, January 16, 1937



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•First Glances at New Books

Additional Reviews
On Page 46

Mathematics

PORTRAITS OF EMINENT MATHEMATICIANS WITH BRIEF BIOGRAPHICAL SKETCHES, Portfolio I: 12 portraits—David Eugene Smith—*Scripta Mathematica*, \$3. Archimedes, Copernicus, Viète, Galileo, Napier, Decartes, Newton, Leibniz, Lagrange, Gauss, Lobachevsky and Sylvester. So runs the collection of portraits and brief biographies in this beautiful collection edited by one of the nation's best known historians of mathematics. Many a school classroom will have these pictures framed on the walls just as, thirty years ago, they mounted Prof. Smith's earlier collection. The author promises other collections in the future, which is good news to all those who wish to make mathematics more human by showing what the great leaders in that science looked like.

Science News Letter, January 16, 1937

Chemistry

THE CHEMISTRY OF NATURAL PRODUCTS RELATED TO PHENANTHRENE—L. F. Fieser—*Reinhold Pub. Corp.*, 358 p., \$6.50. Another important book in the American Chemical Society's series of scientific monographs. Prof. Fieser points out that phenanthrene is related to the sterols and bile acids. And also to sex hormones, heart poisons secreted by toads, and cancer-creating chemicals, to mention only a few more. As one of the basic building blocks of organic chemistry, it deserves every one of its more than three hundred pages.

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Anatomy

CLEARING AND STAINING SKELETONS OF SMALL VERTEBRATES—D. Dwight Davis and U. R. Gore—*Field Museum of Natural History*, 15 p., 35c.

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Electrical Engineering

FUNDAMENTALS OF ELECTRICITY—Charles F. Petersen—*Bruce*, 112 p., illus., 96c. Electricity for boys of the junior high school age but so written that pupils in the seventh and eighth grades can understand it.

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Physics

THE WORLD AROUND US, A MODERN GUIDE TO PHYSICS—Paul Karlson—*Simon and Schuster*, 293 p., 8 plates, \$3. Thoroughly readable in the sense that it may be recommended to those who have never had even an elementary

course in physics, this is a contribution to the popularization of science. The illustrations by W. Petersen in the form of sketches in the text are attractive. It was written in Germany and comes to America by way of England as a result of editing by A. E. Fisher.

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Science

MODERN SCIENCE PROBLEMS, A TEXTBOOK IN GENERAL SCIENCE—Ellsworth S. Obourn and Elwood D. Heiss—*Webster*, 322 p., illus., \$1.08. Arranged on the unit plan, the 182 included experiments for teacher or pupils should vivify and make more effective the teaching.

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Biography

BROOKINGS, A BIOGRAPHY—Hermann Hagedorn—*Macmillan*, 334 p., \$3.50. The story of the life of the founder of the Brookings Institution in Washington—that organization which is using scientific methods upon economic problems—and also the "refounder" of Washington University in St. Louis

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Technology

PROCEDURE HANDBOOK OF ARC WELDING DESIGN AND PRACTICE (4th ed.)—*Lincoln Electric Co.*, 819 p., illus., \$1.50. Complete and exhaustive information on modern welding practice for the artisan and engineer alike.

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Geometry

DESCRIPTIVE GEOMETRY PROBLEM BOOK—Frank W. Bubb—*Macmillan*, 12 p., 300 figures, \$1.75. Three hundred problems—more than sufficient for any course on the subject—are given on detachable sheets of paper with the basic lines already printed on them. The aim of the book is to emphasize, for the student, that in geometry he must think in three dimensions but draw in two. The problem book was designed to supplement the text of the author on the subject but can be used separately.

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Acoustics

THE NEW ACOUSTICS—N. W. McLachlan—*Oxford*, 166 p., \$2.75. British survey book of applied acoustics which starts with the beginnings of radio broadcasting in the early 1920s.

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History of Science

THE STUDY OF THE HISTORY OF SCIENCE—George Sarton—*Harvard Univ. Press*, 75 p., \$1.50. Prospective purchasers of this book should carefully note its title; for it is not a history of science but the research procedures required if one wishes to study the history of science. Both scientists and historians will find this book by Prof. Sarton stimulating.

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Aeronautics, Juvenile

THE DIRIGIBLE BOOK, A PHOTOGRAPHIC PICTURE-BOOK WITH A STORY—William Clayton Pryor and Helen Sloman Pryor—*Harcourt, Brace*, 100 p., plates, \$1. Following the newer technique of telling a continuous story in pictures, the authors take two children, Bill and Ann, under, over, around and inside dirigibles from the little blimps to the giant Hindenburg.

Science News Letter, January 16, 1937

Mechanics

INGENIOUS MECHANISMS FOR DESIGNERS AND INVENTORS, VOL. II—Franklin D. Jones—*Industrial Press*, 538 p., illus., \$5. Don't be fooled by the title of this book. It is not a collection of nut inventions, as one might suppose, but highly intricate and skillful machines to do special tasks. Want to see how to wind golf balls with spherical cores, or how a hat finishing machine with a mechanism for changing the angular velocity works? They are there along with something like 500 others. The value comes, of course, in being able to realize how a problem solved in one field may be turned to virgin inventive territory.

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Mathematics

LA MASSE EN CINÉMATIQUE ET THÉORIE DES TENSEURS DU SECOND ORDRE—Ch. Platrier—*Hermann & Cie, Paris*, 81 p., 18fr.

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Mathematics

CINÉMATIQUE DU SOLIDE ET THÉORIE DES VECTEURS—Ch. Platrier—*Hermann & Cie, Paris*, 55 p., 12fr.

Science News Letter, January 16, 1937

Mathematics

CINÉMATIQUE DES MILIEUX CONTINUS—Ch. Platrier—*Hermann & Cie, Paris*, 34 p., 8fr.

Science News Letter, January 16, 1937